Part 107 Waiver Section Specific Evaluation Information

The factors that are considered while reviewing an application for an operational waiver include, but are not limited to, the aircraft to be flown in the operation, operational location, the unique hazards of the proposed waivered operation, and the risk mitigations proposed by the applicant. The waiver process is designed to rapidly respond to industry change, technological developments, and knowledge gained from previous small unmanned aircraft system (sUAS) operations and operational approvals.

Areas Evaluators Focus on During Evaluation of a Waiver Application

An evaluator focuses their efforts on reviewing the applicant's concept of operations (CONOPS) and the operational hazard and risk analysis submitted by the applicant. A CONOPS should include a detailed description of the proposed sUAS operation, sUAS, operational procedures, operational location, operational limitations, hazards, risks, and risk mitigations. A risk analysis should include the severity of each hazard's effect(s), likelihood of each hazard's effect(s), risk mitigations, and predicted residual safety risk with all mitigations in place. An evaluator reviews the following:

- The CONOPS to understand the proposed sUAS operation, location, limitations, and proposed procedures.
- The applicants risk analysis document and each hazard's effects before mitigations are applied as provided in the waiver application, and the severity and likelihood of each hazards effects after mitigations are applied. FAA orders 8040.4 and 8040.6 provide examples and instructions on performing a risk assessment and definitions which may be used for severity and likelihood.
- The rationale and supporting data provided by the applicant to substantiate how each mitigation reduces the severity or likelihood of each hazards effects or risk to an acceptable level.
- The applicant's predicted operational risk after mitigations are applied to the sUAS operation

Manuals Submitted in a Waiver Application

Part 107 operations are performed by entities or individuals who may not hold an air operator or air carrier certificate. The FAA does not accept or approve manuals in a part 107 waiver application. However, manuals and procedures provided by a waiver applicant in a waiver application indicate a strong commitment to safety and consistency in their proposed operation. Manuals and procedures are viewed positively by the evaluator during the evaluation process. Evaluators will consider whether manuals and procedures help limit the severity or likelihood of a hazard's effect(s),

including reviewing the specific rationale provided by the waiver applicant in the risk assessment. Although it is not required, it is strongly recommended the applicant provide the location of each specific hazard or risk mitigation in the manual to make the review process more efficient and productive for both the reviewer and the applicant. An evaluator may use the request for information (RFI) process to request the location of each specific hazard or risk mitigation in the submitted manual(s). A document prepared similarly to a part 135 compliance statement is one example of how an applicant may point to specific hazards or risk mitigations contained in their manual or manual system, and where in the waiver application or manual the mitigation can be located. Evaluators may reference the information provided by a waiver applicant in a manual as supporting documentation for risk mitigations identified in the applicant provided risk assessment. Under a waiver to a section of part 107, the Responsible Person is responsible for the safety of the operation, and all content submitted in a waiver application. As such, the manuals should belong to the person or company requesting the waiver.

Section Specific Evaluation

107.25 Operation from a Moving Vehicle or Aircraft

If waived, this section permits operations from a moving land or water-borne vehicle if the operation is conducted in an other than sparsely populated area or operations from a moving aircraft. “Sparsely populated” is addressed in the pre-amble to part 107. (Waivers will not be issued for operations which propose to comply with the rule and operate from a moving land or waterborne vehicle in a sparsely populated area.) Waivers are prohibited by rule for being issued to this section to perform carriage of property of another for compensation or hire. Many applications for this section ask the FAA to make a legal interpretation on whether or not the flight location is considered sparsely populated. Critical thinking must be applied by the Remote Pilot in Command (RPIC)to determine if the proposed flight will occur in a “sparsely populated” area. References available to the RPIC include the pre-amble to part 107 and Advisory Circular 107-2 which both contain examples and information on “sparsely populated” to assist a RPIC in making their decision. Areas to consider should include but is not limited to the area of operation, aircraft capability, performance, reliability, etc.

An evaluator reviewing a request to section 107.25 will ensure:

- The proposed operation has acceptable procedures in place to mitigate the additional hazards caused by operating a sUAS from a moving vehicle. Some examples of additional hazards created when operating a sUAS from a moving vehicle are:

- Hazards presented by a dynamic and potentially constantly changing operational environment. Most sUAS operations are static in nature in regards

to the RPIC moving during the operation. The additional hazards presented by the RPIC operating the aircraft from a moving vehicle or aircraft may be dependent on the sUAS being operated and the operational location. An example of a dynamic hazard is other moving vehicles and pedestrians which may not be seen in sufficient time to avoid creating a hazard to those persons.

- Loss of line of sight and compliance with 107.31, normally most sUAS RPIC's do not move during operations and position themselves in the best place to observe the aircraft and airspace. During moving vehicle operations, there may be obstructions to viewing the airspace, the aircraft or the surrounding area presented by vehicle itself, or other obstacles encountered while moving. Additional operational distractions caused by the operation of a moving vehicle, examples include communications regarding operation of a car, aircraft, or abnormal or emergency condition of the moving vehicle or aircraft.

- Moving vehicle operations may cover a large geographical area or linear distance, so sUAS communication failure/lost link should be covered. Communications failure/lost link must be carefully considered to ensure the operation remains complaint with the part 107 sections not waived. For example programming to return the sUA to the original departure point as the result of a loss of communications may be over persons, in non-compliance with 107.31, and create a hazard to other aircraft.

107.29 Daylight Operation

Rulemaking has recently been published to allow operations at night without a waiver. Per the rule operators are still allowed to apply for a waiver to 107.29, but are recommended to comply with the rule to accomplish routine operations at night.

107.31 Visual Line of Sight Aircraft Operation

If waived, this would allow the Remote Pilot in Command (RPIC) to operate the sUAS without meeting a portion or all the requirements listed in 107.31. These operations are commonly referred to as beyond visual line of sight (BVLOS). A BVLOS operation can take several forms and generally refers to an operation that does not comply with 107.31 as written. This does not necessarily mean a direct participant in the operation is not or cannot maintain line of sight with the sUAS as described in 107.31. Waivers have previously been issued to 107.31 for the following types of BVLOS operations:

- Operations where there is physical obstruction to vision such as a wall or vegetation, and the sUAS remains within a distance the operation could comply with 107.31 if it was not obstructed by an object. An example of this type of BVLOS would be operating the sUAS on the other side of a building where the RPIC is not able to see the sUAS to determine the location, altitude, orientation, and attitude of the sUAS using unaided human vision.

- Operations where the visual observer(s)maintain compliance with 107.31 however the RPIC is unable to, for the entire duration of the sUAS operation. This strategy is sometimes referred to as “daisy chain visual observers,” the RPIC “or” a visual observer will maintain compliance with 107.31. An example of this type of BVLOS operation is mapping of a field at low altitude where the RPIC will be unable to make the determinations required because of the distance the sUAS will fly from their viewing position. The RPIC may have a visual observer or visual observers around the field or at the other side of the field and either the RPIC, or a visual observer will maintain compliance with 107.31 for all portions of the flight, but the RPIC or the visual observer would be unable to maintain compliance with 107.31 for the entire sUAS operation. Another example of this type of operation is where a RPIC is located in a different geographical location than the sUAS and unable to see the sUAS from the ground control station during operations. Another part 107 certificated RPIC who acts as a visual observer during the flight maintains compliance with 107.31. In this type of operation, the visual observer will act as the RPIC for pre-flight activities and then relinquishes control to the remotely sited RPIC the duties and responsibilities listed in 107.19.

- Operations where no person in the operation maintains compliance with 107.31(a)(3-4) and (b), but not 107.31(a)(1-2). This strategy is sometimes referred to as “airspace surveillance.” This type of operation relies on human vision for detecting other aircraft. An example of this type of operation is where the RPIC and one or more visual observers continue to communicate effectively and monitor the airspace surrounding the sUAS operational area. If an aircraft is detected, the sUAS operations ceases until the other aircraft is clear of the operational area.

- Operations relying on technology to detect other aircraft. This technology could include use of radio frequencies, vision sensors, audio sensors, combination of multiple types of sensors, or another type of sensor proposed by the applicant. Operations relying on sensors to detect other aircraft may require the sUAS or detection equipment be FAA certified, including any onboard detection equipment, and an evaluator will forward these types of applications to the Aircraft Certification Office or AFS-400 for review.

An evaluator reviewing a request to 107.31 will review:

- How the RPIC will be able continuously know and determine the altitude, attitude, and movement of the sUAS and ensure the sUAS remains in the intended area of operations without exceeding the performance capabilities of the command and control link.

- How the RPIC will detect and avoid all other aircraft and avoid flying over or into persons on the ground, and ground based structures and obstacles, or how the operation proposes to comply with § 107.39.
- How the RPIC will increase the visual conspicuity of the sUAS to make it more visible to other aircraft.
- How the RPIC is alerted of degraded sUAS functionality.
- How the RPIC and any other direct participants have the relevant knowledge, experience, and skill to operate the sUAS BVLOS.
- How the operation will comply with the requirements listed in 107.51 during BVLOS operations.
- The command and control links used in the sUAS, including the FCC authorizations for any transmitter used in the sUAS.

Signal Spectrum Use for BVLOS Operations

An evaluator will review the signal spectrum utilized in the sUAS and approved Federal Communications Commission (FCC) licenses issued for those devices to ensure the operation has appropriate command and control links necessary to ensure the safety of the proposed operations and other airspace users. BVLOS operations should not rely on systems operating under part 5 or 15 of the FCC rules because authorization under those parts of the FCC rules require the operation of these devices to be on an interference basis. Interference basis means they may not have a primary frequency allocation and are not guaranteed to have access for use on the frequency, and must accept any and all frequency interference or the effects of frequency congestion. The effects of frequency interference and congestion may lead to delayed responses of the sUAS to commands sent from the ground control station or cause the sUAS to lose its communications link. Devices operating under part 5 or 15 of the FCC rules generally do not provide for a sufficient level of safety, for BVLOS sUAS operations, where the control link is critical to the safety of the sUAS operation. Operations where the communications or information transfer throughout the sUAS is critical to the safety of the operation should not rely on these device authorization categories. It may be necessary to contact the Spectrum office in ATO for further guidance on FCC authorizations, frequency allocations, uses, grants of authorization, grants of authorization limits of use, transmit power, antenna's, and to ensure the command and control link frequency is appropriate for the proposed sUAS operation. An example of a safety critical communication is a command sent to a sUAS to change course to avoid another aircraft, or sensor information obtained from the sUAS, sent to a device used by the RPIC to determine if another aircraft may be a potential collision hazard. Since avoiding another aircraft is a safety critical function, a device

which must accept interference and which may operate on a secondary frequency allocation basis does not provide an expectation for service reliability, and should not be used for this function.

Detect and Avoid

Detect and avoid (DAA) performance will be evaluated at the individual sUAS level. This means an evaluator will not focus on sensor performance (detect) only. The safety of a DAA system is measured at the end state, after the avoid maneuver has been completed to ensure a well clear distance has been maintained from other aircraft. DAA systems must have the ability to detect cooperative (ads-b, transponder equipped, or other radio frequency location reporting means) and non-cooperative aircraft (no electronic or radio frequency position reporting). Cooperative and non-cooperative traffic performance are measured independently. For example a system with a 100% detection rate of cooperative aircraft, may detect 0% of non-cooperative aircraft. A blended number based on an assumption of cooperative vs. non-cooperative traffic densities may artificially show a higher DAA system performance level than can be assured or expected in real-world sUAS operations.

At the time of publication of this information, the FAA has not approved or determined any technology to sufficiently detect and avoid other aircraft under terms and conditions of a waiver. The applications approved to use a technology to detect and avoid other aircraft have been test cases or to support information gathering to develop standards and test methods to determine DAA effectiveness. For scalable and repeatable technology based 107.31 waivers, the FAA intends to utilize a risk based approach to authorizing technology based DAA for use under a waiver to part 107.31. A risk based approach means the higher the operational risk, the more validation is required during the review process. In general, the further the operation is from controlled airspace, persons, and others property, the lower the overall operational risk. For low risk location specific testing operations, an applicant statement and data could be sufficient to issue a 107.31 waiver with DAA relying on a technology. For medium risk BVLOS operations, the applicant should provide 3rd party validation of the DAA systems performance and meet an industry established DAA standard. For high risk operations, the applicant may be required to have the sUAS and DAA technology certified by the FAA or another civil aviation authority (CAA) the FAA has a reciprocal certification agreement with. An applicant who is requesting to perform long range BVLOS operations using a technology based DAA solution should be aware their operation may be outside the intent of part 107 and required to comply with part 91 regulations.

Examples of DAA system performance standards a waiver applicant may use to demonstrate their DAA systems performance is adequate for the requested location or airspace risk class;

- ASTM F3442/F3442M-20 Standard Specification for Detect and Avoid System Performance Requirements. ASTM F3442/F3442M-20 provides for minimum performance levels for defined classes of airspace and altitudes. These performance levels are expressed in a term called risk ratio (RR). A RR is the amount of collisions avoided or the number of loss of well clear breaches avoided because of the added safety of the technology used, divided by the total number of encounters. The lower the risk ratio the more effective the sUAS is at detecting and avoiding other aircraft. A perfect RR where all other aircraft are detected and avoided is 0. Avoiding another aircraft encounter because of strategic mitigations or choosing to stay on the ground because another aircraft is in the area, is not part of the RR calculation. Another example of a performance standard is the RTCA DO-365 Minimum Operational Performance Standards (MOPS) for Detect and Avoid (DAA) Systems.

An applicant may request a different standard, or their own performance standard to be used. The waiver application should provide the analysis, validation, and objective data to support DAA system performance for the area of operation and operational environment and conditions the applicant is proposing sUAS operations.

DAA systems used for BVLOS operations should be certified by the FAA. In the absence of an FAA certified DAA system, an applicant may propose an alternate means to demonstrate sUAS DAA system performance. An applicant should provide information detailing how their proposed DAA system performs in a manner specified by an industry published DAA standard. In the absence of both an FAA Certified DAA system and industry standard, the FAA will evaluate the proposed systems performance on an individual basis, and determine if it is adequate for the proposed location and operation. Manufacturers who wish to obtain repeatable and scalable DAA based waivers, should utilize the type certification process for their sUAS. An evaluator will not recommend a waiver be issued to a proposed BVLOS sUAS operation without an active DAA system on a sUAS when another aircraft could be encountered during flight. A sUAS operating BVLOS, must be able to detect and avoid other aircraft or demonstrate no other aircraft will be present through airspace segregation. Examples of airspace that is considered as segregated is operations within an active and charted restricted area or Temporary Flight Restriction (TFR).

Use of ground based radars

Ground based radars used for radio navigation must be issued a grant of authorization by the FCC to operate under part 87 and operated within the conditions and limitations of the grant of authorization. Ground based radars used for radio location must be issued a grant of authorization by the FCC to operate under part 90 and operated within the conditions and limitations of the grant of authorization. An applicant should provide the FCC grant number located on the device they intend to operate in the sUAS operation. If the device does not have a FCC identification

(ID) number on it, or the applicant is unable to provide the FCC grant number in the application, a waiver will not normally be issued.

Use of Visual Observers

An applicant may request to use one or more visual observers (VO or VOs) to monitor the airspace during a BVLOS operation. Use of a VO or VOs could be considered an acceptable method to detect other aircraft. A waiver applicant should demonstrate the VOs are able to have an unobstructed view of the airspace from the surface of ground to above the intended operational altitude, throughout the proposed operational area. The operation must be able to demonstrate the VO(s) ability to detect other aircraft which may represent a collision hazard in sufficient time for the sUAS operation to successfully avoid and remain well clear of the other aircraft. Prior research and previously approved waiver applications have demonstrated a person is generally effective at detecting most other aircraft headed towards a person at a distance of 1.5 statute miles (SM). Aircraft on tangential trajectories are detected at distances between 2-2.5 SM. An evaluator will utilize these reference distances to determine if the proposed sUAS operation could maintain a sufficient view the airspace surrounding the sUAS in flight to detect other aircraft. Previously 2 SM has been used as a blended distance of airspace as a performance based limitation to view around the sUAS in flight. The ability to view the airspace in flight is not the same as detecting another aircraft. Aircraft detection distances may vary significantly based on contrast, lighting conditions, prevailing visibility, apparent movement, aircraft size, and aircraft altitude. An evaluator will ensure the sUAS operation can detect aircraft which represent a potential hazard to the operation. A proposed operations ability to detect another aircraft operating at 1500’ above ground level (AGL), which does not present collision hazard or loss of well clear distance from the sUAS, does not demonstrate a proposed operations ability to sufficiently detect other aircraft. The proposed sUAS operation should also demonstrate the ability to avoid other aircraft at the maximum operational distance from a direct participant. Detecting another aircraft does not necessarily ensure the other aircraft can be avoided or the sUAS flight path can be altered in sufficient time to remain well clear of the other aircraft. For example if the sUAS cannot be rerouted in flight or has limited ability to change direction of flight, it may not be able to successfully avoid another aircraft, even if the operation can detect 100% of other aircraft operating in the intended flight area. An example of one method and what is required of the applicant to determine the maximum operational distance from a VO:

- VO identifies another aircraft at 1.5 SM, applicant must identify the amount of time it takes for the VO to determine the track of the other aircraft and communicate this information to the RPIC. The applicant should provide a time in seconds reasonable for the communication system utilized in the proposed operations. Most available studies on this suggest it takes at least 10-20 seconds for a person to identify the aircraft, determine the direction of flight, and communicate this information to the RPIC.

- Identify the amount of time required for the RPIC to make a determination if an avoidance maneuver is needed to maintain well clear or not present a collision hazard, and to identify the desired avoidance maneuver. The applicant should provide a time in seconds reasonable for the situational awareness information presented to the RPIC.

- Identify the amount of time it would take the RPIC to maneuver, the applicant should provide a time in seconds reasonable for the maneuverability of their sUAS, the maneuver choices available to choose from, and how the entry of the commands into the ground control station is performed.

- Identify the amount of time the sUAS requires to complete the maneuver to remain well clear. The applicant should provide a time in seconds for each maneuver choice available to the RPIC or the time in seconds based on the performance of the sUAS. For example, if the sUAS is operating at 400' AGL, they applicant should present the amount of time it would take the sUAS to descend 400 feet to the ground, or the amount of time it would take the sUAS to travel to a well clear distance from a worst case scenario encounter geometry with another aircraft.

- All the above times should be added together to get a cumulative time in seconds the sUAS operation requires to detect and avoid another aircraft. This time, in seconds should be converted into linear distance using the average aircraft speed at the location, or a suitable source for average or mean aircraft speed for the class of airspace operations are proposed to occur in. For example, the average speed of aircraft below 400 feet in Class G airspace is about 120 knots. If the sUAS maneuver to avoid other aircraft is land, use the time provided by the applicant in seconds from detect to land. For this example we will say the cumulative time to detect and avoid is 30 seconds. Use the following formula and solve for distance:

Speed * Time = Distance,

120 knots * 30 seconds = 1 nautical mile (NM)

Subtract 1NM from the detect distance of 1.5 NM mile to determine the maximum operational distance of the sUAS from the RPIC or a VO. In this example, the maximum sUAS operational distance to be able to detect and avoid other aircraft from a direct participant in the operation is .5 NM.

Masking/Shadowing

The concept referred to as masking and shadowing is not considered an alternate method to avoid other aircraft or remain well clear of other aircraft. Masking/shadowing is considered a strategic operational mitigation to lower the encounter rate with other aircraft. A BVLOS waiver applicant should provide a means for detecting, yielding the right of way, and remaining well clear of all aircraft, airborne vehicles, and launch and reentry vehicles. The sUAS, at all times, including emergency and contingency operations, must remain within the waiver applications specified masking/shadowing distance to provide an aircraft encounter mitigation credit for Masking/Shadowing. Waiver applicants who request or propose a lower DAA performance level because of their strategic mitigation of Masking/Shadowing, must demonstrate the sUAS ability to remain in the specified area. This is generally accomplished through the Type Certification process.

Combining with Waivers to Operate Over Human Beings and Moving Vehicles

BVLOS operations must account for operation over human beings, rulemaking has recently been published to allow operations over people without a waiver. Per the rule operators are still allowed to apply for a waiver to 107.39, but are recommended to comply with the rule to accomplish routine operations over human beings. A restricted or controlled access area could be considered one way to demonstrate compliance with 107.39 during a BVLOS operation by ensuring non-participants would not be present in the operational area.

107.33 Visual Observer

A visual observer (VO) is not a requirement under the regulation for all sUAS operations. As such, waivers are not issued for this section only. This waiver section may be included in a waiver for other sections subject to waiver. Commonly this section is waived in conjunction with 107.31. If the RPIC or a VO will maintain visual line of sight (VLOS) with the sUAS during flight, the word “or” is used in a waiver to denote this. For example “operations may be conducted beyond the visual line of sight of the remote pilot in command **or** the visual observer.” If the neither the RPIC or the VO, or not all the VOs may be able to maintain line of sight (LOS) with the sUAS during flight, the word “and” should be used in a waiver to denote this. For example “operations may be conducted beyond the visual line of sight of the remote pilot in command **and** any visual observer used in the operation.”

107.35 Operation of Multiple Small Unmanned Aircraft

Operation of multiple sUAS applies to any remote pilot in command, control manipulator, or visual observer. For example, if two RPIC’s utilize the same visual observer, and both sUAS are in flight at the same time, the visual observer would be

considered to be involved in operating more than one sUAS at the same time, and the operation must occur under a waiver to section 107.35. Most aircraft operated under part 107, operate on a non-airworthiness basis without a type certificate issued by the FAA. Outside the type certification process, the FAA does not evaluate, approve, or accept the sUAS or software. The mitigations for this type of operations should rely on environmental mitigations to achieve an acceptable level of safety and locations, sUAS, or proposed operations with low intrinsic operation risk.

An evaluator reviewing a request to 107.35 will review

The operating location or performance criteria proposed by the applicant to ensure a failure of a sUAS will not place a person or others property at undue hazard. Examples of previously acceptable methods or performance criteria are, restricted access areas devoid of non-participants or others property, operations with sUAS which will not cause an injury to persons or damage others property, and sufficient distance between the operational location and non-participants or others property

An applicant could use at least a 1-1 ratio between maximum altitude of the operation and distance from edge of operational location. For example if an applicant proposed operating at 400 feet, they should not operate at any time within 400' horizontally of a person. This concept is often referred to as a "buffer zone." An evaluator should be cognizant of other factors which may increase this distance. High potential sUAS speeds or sUAS which have a longer glide distance may require a larger "buffer zone." The "buffer zone" should be sized to ensure a sUAS failure would impact the ground prior to traveling far enough to impact a person or damage others property. High potential speeds of sUAS or fixed wing sUAS with larger glide distances may increase "buffer zone" distances.

107.37(a) Operation Near Aircraft; Right-of-Way Rules

A waiver to this section would allow the sUAS to not yield the right of way or maintain a well clear distance to all aircraft, airborne vehicles, and launch and reentry vehicles. To obtain a waiver to this section, an applicant should demonstrate that not yielding the right of way to all other aircraft, airborne vehicles, launch and reentry vehicles, and operating within a well clear distance would not adversely affect the safety of the national airspace system (NAS) and other aircraft not participating in the sUAS operation.

107.39 Operation Over Human Beings

Rulemaking has recently been published to allow operations over human beings without a waiver. Per the rule operators are still allowed to apply for a waiver to 107.39, but are recommended to comply with the rule to accomplish routine operations over human beings.

107.41 Operations in Certain Airspace

AFS does not adjudicate applications for this section. An FAA Flight Standards Service (AFS) evaluator does not evaluate an application for authorization or waiver for this section. Applicants may request an operational waiver issued by AFS be combined with an airspace authorization or waiver issued by FAA Air Traffic Organization (ATO). The process to combine a waiver issued by AFS with an airspace authorization or airspace waiver issued by ATO is: The applicant must submit two separate requests in DroneZone.

- A request for the section(s) AFS is the office of primary responsibility (OPR)
- A request for airspace authorization or waiver to ATO the OPR

The request for airspace authorization or waiver to ATO should include the reference number of the applied for or issued waiver from AFS. ATO will verify the waiver requested from AFS has been issued prior to issuing an airspace waiver or authorization to be combined with an AFS issued waiver. ATO will write into the airspace authorization or waiver a statement or provision allowing combination with a specific AFS issued waiver number. If a waiver is written with the following statement "This Waiver is valid for Class G airspace only and may not be combined with any other waiver(s), authorizations(s), or exemption(s) from the FAA," ATO will not allow combination with an airspace authorization or waiver. AFS will place this statement in waiver when the waiver application was evaluated for operations within Class G airspace, or there are mitigations or mitigation strategies proposed in the waiver application which may not be appropriate for operations above 400 feet AGL or within controlled airspace. If the waiver request is disapproved by AFS, ATO may issue the airspace authorization or request without allowing combined operations with an AFS issued waiver.

107.51 Operating Limitations for Small Unmanned Aircraft

107.51(a) waiver requests are reviewed and issued by AFS. A waiver to this section would allow the sUAS to operate at a ground speed exceeding 100 miles per hour. An applicant should demonstrate that the additional potential hazard(s) posed by the increased operational speed does not degrade the safety of the NAS or place non-participants at undue risk. Examples of how an applicant could demonstrate sufficient hazard mitigations from the increased operational are:

- Restricted access locations or areas
- Physical barriers meeting a performance standard adequate to prevent the sUAS from impacting a person or others property

107.51(b) A waiver to this section would allow the sUAS to operate above 400 feet AGL while not within 400 feet of a structure.

Applications for 107.51(b) are reviewed by AFS and ATO. AFS is responsible for reviewing the ground risk and air risk mitigations. The increased altitude may affect the ability of the applicant to comply with 107.31, 107.39 and put additional person or property at risk, in the event the sUAS fails for any reason. Applicants must address how the operation maintains compliance with the visual line of sight requirements listed in 107.31. This includes the ability to determine if their sUAS is above or below another aircraft, or they may demonstrate the ability of the sUAS to land prior to the sUAS becoming a collision threat to another aircraft. An evaluator will refer to the human eye's physiological limitations (Snellen equation) and perception error research to determine if VLOS can reasonably be maintained at the distance and altitude requested in the application. An increase in altitude may increase the potential injuries and property damage a failed sUAS may cause. An applicant must demonstrate when the sUAS is operating over 400' agl, no additional hazard is posed to persons and property, and the operation has the ability to comply with 107.39. If the ground and air risk mitigations are sufficient to issue a waiver, AFS will draft a waiver and forward to ATO for review and concurrence. ATO is responsible for reviewing the airspace requested in the 107.51(b) waiver application. If ATO determines operation of the sUAS will not cause undue hazard to other aircraft, ATO will sign the waiver, and return the signed waiver to AFS for issuance to the requestor through DroneZone.

107.51(c) A waiver to this section would allow the sUAS to operate with less than 3 statute miles visibility from the control station. sUAS operated under part 107 do not operate under Visual Flight Rules or Instrument Flight Rules as specified in part 91 and part (add other parts and references to airspace), any waiver issued for this section should contain the phrase "This Waiver is valid for Class G airspace only and may not be combined with any other waiver(s), authorizations(s), or exemption(s) from the FAA," ATO may not allow combination with an airspace authorization or waiver. AFS will place this statement in waiver when the waiver application was evaluated for operations within Class G airspace, or there are mitigations or mitigation strategies proposed in the waiver application which may not be appropriate for operations above 400 feet AGL or within controlled airspace. An evaluator will ensure the proposed sUAS operation has an adequate method to comply with 107.37 when operating with reduced visibility. An evaluator will ensure loss of control of the sUAS for any reason would not pose an additional hazard to the NAS or non-participants and ensure there is an accurate method to measure the visibility from the location of the ground control station. The method should not rely on nearby visibility readings because visibility can change rapidly and is not always consistent in low visibility areas.

107.51(d) A waiver to this section would allow the sUAS to operate closer than 2000 feet horizontal or 500 below a cloud. sUAS operated under part 107 do not operate under visual flight rules (VFR) or instrument flight rules (IFR) rules as specified in part 91 and the RPIC and sUAS may not comply with IFR requirements for operations in controlled airspace, any waiver issued for this section should contain the phrase "This Waiver is valid for Class G airspace only and may not be combined with any

other waiver(s), authorizations(s), or exemption(s) from the FAA," ATO should not allow combination with an airspace authorization or waiver. AFS will place this statement in waiver when the waiver application was evaluated for operations within Class G airspace, or there are mitigations or mitigation strategies proposed in the waiver application which may not be appropriate for operations above 400 feet AGL or within controlled airspace. An evaluator will ensure the proposed sUAS operation has an adequate method to comply with 107.37 when operating with reduced distance from clouds.